8. Integration

| Mark | / 15 | % |

1) Find an expression for $f(x)$ given that [2]

a) $f'(x) = x^3$

b) $f'(x) = 2x^5 + 6x^{-4} - \dfrac{1}{2}x^{-\frac{2}{3}}$

2) Find an expression for y given that [3]

a) $\dfrac{dy}{dx} = 145x^{\frac{1}{5}}$

b) $\dfrac{dy}{dx} = 10x^3 + x^{-5} - 7x^{\frac{1}{3}}$

c) $\dfrac{dy}{dx} = 2x^{\frac{1}{3}} - 6x^4 - 8x^{-3}$

3) Find [7]

a) $\displaystyle\int \left(14x^{\frac{2}{3}} + 11x^3\right)dx$

b) $\displaystyle\int (20x^3 + 6x^{-5} + a)dx$

c) $\displaystyle\int (2x^4 - 2d + 20x^{-2})dx$

d) $\displaystyle\int (9x - 4)^2\ dx$

e) $\displaystyle\int (3\sqrt{x} + 5)^2\ dx$

f) $\displaystyle\int \left(2\sqrt{x} + \dfrac{3}{\sqrt{x}}\right)\ dx$

g) $\displaystyle\int \left(\dfrac{7}{\sqrt{x}} + 3x\sqrt{x}\right)\ dx$

4) Find the equation of the curve given that [2]

a) $\frac{dy}{dx} = 12\sqrt{x} + 6x$ at the point (1,12)

b) $\frac{dy}{dx} = (9x + 3)^2$ at the point (-1,-12)

5) The curve S, with equation $y = f(x)$, passes through the point (1,-3) and $f'(x) = 8x^3 - \frac{9}{x^4}$. Find the equation of S in the form $y = f(x)$.

[1]

Solutions for the assessment 8. Integration

1) a) $f(x) = \frac{1}{4}x^4 + c$

b) $f(x) = \frac{1}{3}x^6 - 2x^{-3} - \frac{3}{2}x^{\frac{1}{3}} + c$

2) a) $y = \frac{725}{6}x^{\frac{6}{5}} + c$

b) $y = \frac{5}{2}x^4 - \frac{1}{4}x^{-4} - \frac{21}{4}x^{\frac{4}{3}} + c$

c) $y = \frac{3}{2}x^{\frac{4}{3}} - \frac{6}{5}x^5 + 4x^{-2} + c$

3) a) $\frac{42}{5}x^{\frac{5}{3}} + \frac{11}{4}x^4 + c$

b) $5x^4 - \frac{3}{2}x^{-4} + ax + c$

c) $\frac{2}{5}x^5 - 2dx - 20x^{-1} + c$

d) $27x^3 - 36x^2 + 16x + c$

e) $\frac{9}{2}x^2 + 20x^{\frac{3}{2}} + 25x + c$

f) $\frac{4}{3}x^{\frac{3}{2}} + 6x^{\frac{1}{2}} + c$

g) $14x^{\frac{1}{2}} + \frac{6}{5}x^{\frac{5}{2}} + c$

4) a) $y = 8x^{\frac{3}{2}} + 3x^2 + 1$

b) $y = 27x^3 + 27x^2 + 9x - 3$

5) $f(x) = 2x^4 + \frac{3}{x^3} - 8$